

Useful Functions for Battery Discharge Tests

Displaying the integrated data during undervoltage protection

You can set a undervoltage protection and measure the integrated data (current capacity, power capacity, elapsed time) from the start of discharge until the load turns off due to the undervoltage protection.

1. Press **SOURCE > Level**.
2. Press **UVP** to select **UVP**.
Each time you press UVP, the selected item changes.
3. Use the numeric keypad or the rotary knob to enter the voltage value.
4. Press **MEASURE>More**.
5. Use the rotary knob to select the following items, and then press **Edit**.

| Item | Description |
|--------------|-----------------------------|
| Elapsed Time | Shows the elapsed time. |
| Capacity | Shows the current capacity. |
| Energy | Shows the power capacity. |

6. Use the rotary knob to select **Enable**, and then press **ENTER**.

Undervoltage protection and integrated data display function will be set.

Turning the load off automatically after a specified time

The load can be turned off automatically after a specified time elapses from the start of discharge.

1. Press **SOURCE > More**.
2. Use the rotary knob to select **Load Off Timer**, and then press **Edit**.
3. Use the numeric keypad or the rotary knob to set the time until load off.
This sets the auto load off timer.

Main Specifications

| Item | PLZ205W | PLZ405W | PLZ1205W |
|--------------------------------------|----------------------------------|----------------------------------|--------------------|
| Ratings | | | |
| Operating voltage (DC) | 1 V to 150 V | | |
| Current | 40 A | 80 A | 240 A ¹ |
| Power | 200 W | 400 W | 1200 W |
| Constant current (CC) mode | | | |
| Operating range | H range | 0 V to 40 A | 0 V to 80 A |
| | M range | 0 V to 4 A | 0 V to 8 A |
| | L range | 0 V to 0.4 A | 0 V to 0.8 A |
| Setting accuracy | H range | ±(0.2 % of set + 0.1 % of range) | |
| | M range | ±(0.2 % of set + 0.3 % of range) | |
| | L range | ±(0.2 % of set + 1 % of range) | |
| Input line regulation ² | 4 mA | 8 mA | 24 mA |
| Constant resistance (CR) mode | | | |
| Operating range | H range | 40 S to 0.002 S | 80 S to 0.004 S |
| | M range | 4 S to 0.0002 S | 8 S to 0.0004 S |
| | L range | 400 mS to 0.02 mS | 800 mS to 0.04 mS |
| Setting accuracy ³ | H range | ±(0.5 % of set + 0.5 % of range) | |
| | M range | ±(0.5 % of set + 0.5 % of range) | |
| | L range | ±(0.5 % of set + 1.5 % of range) | |
| Constant voltage (CV) mode | | | |
| Operating range | H range | 1 V to 150 V | |
| | L range | 1 V to 15 V | |
| Setting accuracy ⁴ | ±(0.1 % of set + 0.1 % of range) | | |
| Input line regulation ⁵ | 12 mV | | |

Key Lock

Setting/releasing key lock

1. Hold down **KEY LOCK**.

🔒, 🔓, or 🔑 is shown on the display depending on the key lock level.

Each time the key is held down, key lock switches between lock and unlock.

Setting the key lock level

You can set three different key lock levels according to the type of keys you want to lock.

1. Press **SYSTEM**.
If the Configure screen does not appear, press **Configure**.
2. Use the rotary knob to select **Lock Level**, and then press **Edit**.
3. Use the rotary knob to select the key lock level.

| Level | Description |
|-----------|--|
| 1: Low | Locks all operations except the following <ul style="list-style-type: none"> • Release key lock • Load on/off • Recall setup memory • Recall ABC preset memory |
| 2: Medium | Locks all operations except the following <ul style="list-style-type: none"> • Release key lock • Load on/off |
| 3: High | Locks all operations except key lock release |

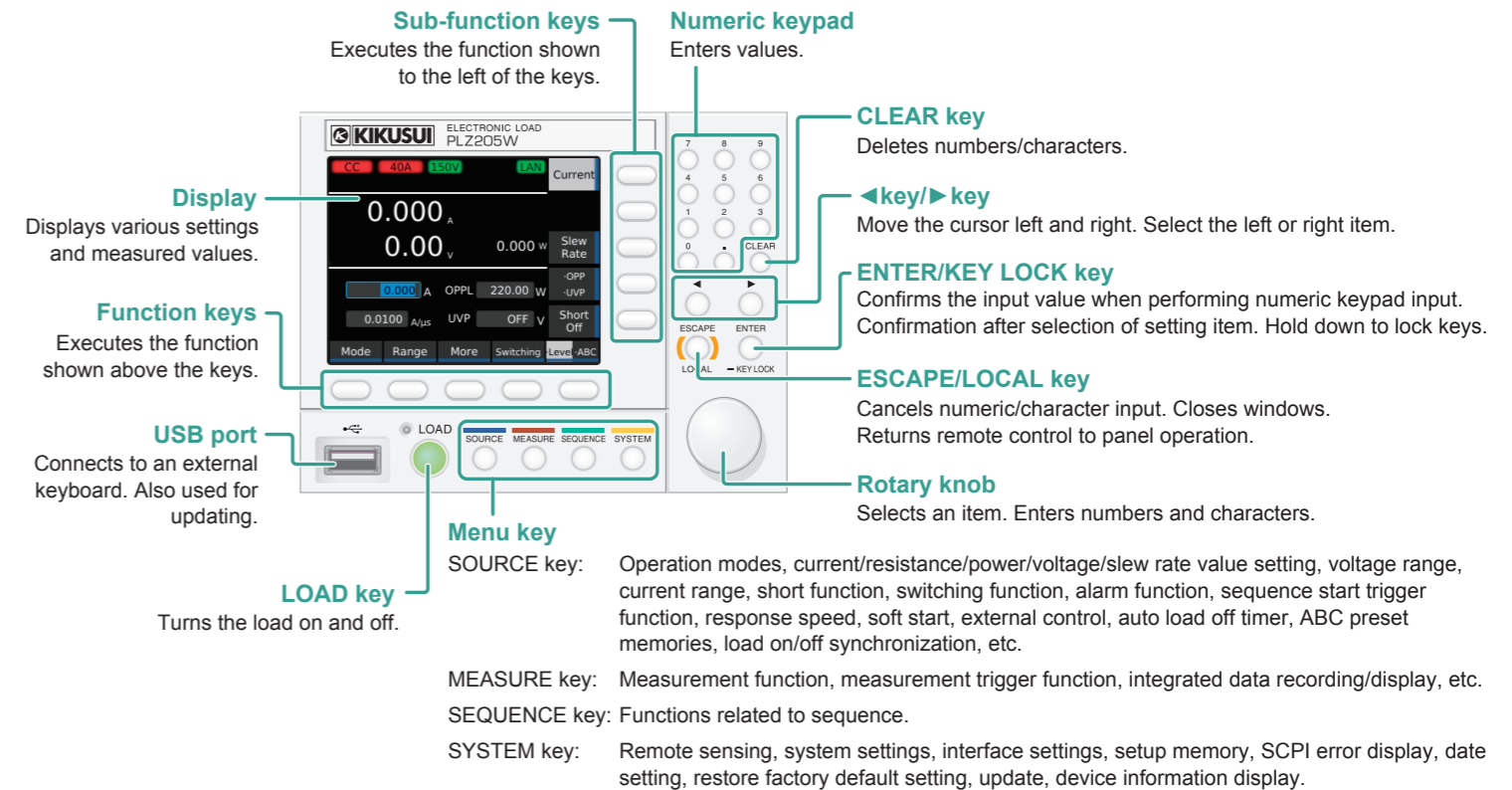
4. Press **ENTER**.

This completes the settings.

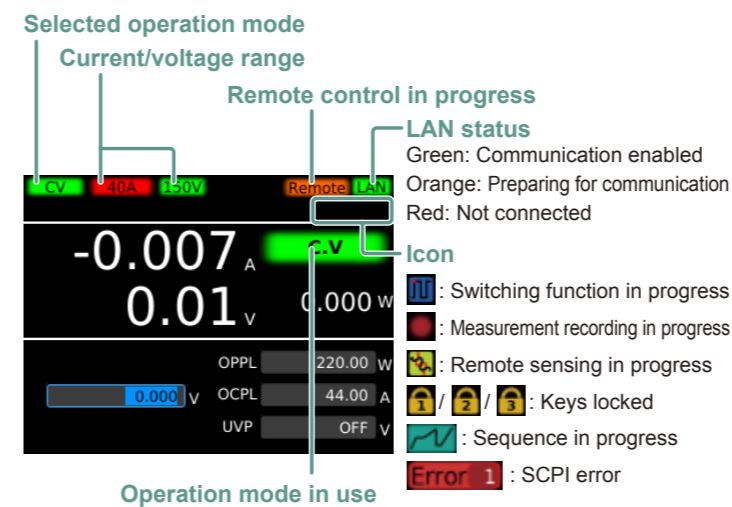
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PLZ-5W Series Quick Reference

The newest version of the operation manual can be downloaded from Kikusui website.
<http://www.kikusui.co.jp/en>



Icon Display



Turning the Load On

1. Press **SOURCE > Mode**, and use the sub-function keys to set the operation mode.

In CC mode, each time you press +CV, the mode switches between CC mode and CC+CV (adds CV mode to CC mode). In CR mode, Each time you press +CV, the mode switches between CR mode and CR+CV (adds CV mode to CR mode).

2. Press **Range**, and use the sub-function keys to set the current range and the voltage range.
3. Press **Level > Current/Conductance/Voltage/Power**.
4. Use the numeric keypad or the rotary knob to enter the value (current, conductance, voltage, power).
5. Press **LOAD**.

The load turns on. Values can be changed while the load is on.



The accompanying CD-ROM also contains the following information.

User's Manual

Component Names
Installation and Preparation
Basic Functions
Advanced Functions
Sequence Function

External Control
Parallel Operation
System Settings
Maintenance
Specifications
Appendix

Communication Interface Manual


Setup
Overview of Commands
Command List
Registers
Appendix
Tutorial

Measurement Function

Starting/stopping measurement

1. Press MEASURE > Acquire.
2. Press Initiate or Abort.

| Purpose | Step |
|-------------------|-------------------------|
| Start measurement | Press the Initiate key. |
| Stop measurement | Press the Abort key. |

 is shown on the display while measurement values are being recorded. By factory default, the measurement value is recorded immediately after the Initiate key is pressed.

Obtaining recorded measurement values

Recorded measurement values are obtained by remote control. For details, see “Command (function search)” > “Measurement function” in the Communication Interface Manual on the included CD-ROM.

Setting triggers

The number of times that measurement values are to be recorded, the recording timing, the recording conditions, and so on, can be specified.

1. Press MEASURE > Acquire.
2. Use the rotary knob to select the items, and then press Edit.

| Item | Description |
|----------------|---|
| Trigger | Sets the trigger. |
| Source | Pressing Initiate causes the PLZ-5W to enter a trigger-wait state. When a trigger selected with Source occurs, the trigger-wait is cleared, and measurement starts. Select the following items. |
| Immediate | Immediately records the measurement values when the Initiate key is pressed, without waiting for trigger application. |
| BUS | Records measurement values when a *TRG command is received from a PC or the like. |
| DIGITAL2 | Records measurement values through signal input to pin 13 of the EXT CONT connector. |
| TALink | Records measurement values when a step is executed if Generate is set to TALink in the sequence step settings. |
| MSync | Records measurement values when any of the synchronized PLZ-5Ws receives a TRIG:ACQ:MSYN ¹ command from a PC or the like through remote control. |
| Count | Sets the number of times measurement values are to be recorded when a trigger is applied. |
| Delay | Sets the delay time from trigger application until measurement value recording. |
| Interval | Sets whether to measure at intervals when Count is 2 or higher. |
| Interval Time | If Interval is set to Enable, set the measurement interval time. |
| Sense Aperture | Measurement time. Each measurement value recorded will be the average during the measurement time. |

1. For details, see “TRIG:ACQ:MSYN” in the Communication Interface Manual on the included CD-ROM.

3. Use the rotary knob or numeric keys to enter a value, and then press ENTER.

Repeat steps 2 and 3 to set triggers.

Displaying the integrated data

Display integrated data (current capacity, power capacity, elapsed time).

1. Press MEASURE>More.
2. Use the rotary knob to select the item, and then press Edit.

| Item | Description |
|--------------|----------------------------------|
| Elapsed Time | Shows the elapsed time. |
| Capacity | Shows the current capacity (Ah). |
| Energy | Shows the power capacity (Wh). |

3. Use the rotary knob to select Enable, and then press ENTER.

The integrated data will now be shown on the display.

Alarm Feature

The alarm function detects anomalies and protects the DUT.

Alarm 1 (high urgency)

This alarm detects anomalies and automatically turns off the load. The operating conditions of this alarm are fixed. When this occurs, immediately remove the cause(s) of the alarm.

| Display | Description | Operation time |
|-----------------------------|--|----------------|
| OVP Alarm | Overvoltage detected. 110 % or higher of the range's maximum voltage was applied. | Load off |
| Reverse Alarm | Reverse connection detected. A reverse voltage (-0.6 V) was applied to the load input terminals. Or, a reverse current (approx. -1% of the range rating) flowed. | Load off |
| OTP Alarm ¹ | Overheating detected. The temperature of the internal devices exceeded a given value. | Load off |
| External Alarm ² | A CMOS low level signal was input to the ALARM INPUT (pin No. 6) of the EXT CONT connector. | Load off |
| Front Alarm | A current of 80 A or higher flowed through the front panel load input terminals. | Load off |

1. Check whether the air inlet on the front panel and the air outlet on the rear panel are being obstructed.
2. First clear the signal input to the EXT CONT connector, then clear the alarm of the PLZ-5W.

Alarm 2 (low urgency)

This alarm protects the DUT. The operating conditions of this alarm can be set freely within a given range.

| Display | Description | Operation time |
|------------------------|--|---------------------------|
| OCP Alarm | Overcurrent protection. Current at or exceeding the OCP setting (0 % to 110 % of rated current) flowed. | Select load off or limit. |
| OPP Alarm | Overpower protection. Power at or exceeding the OPP setting (0 % to 110 % of rated current) was applied. | Select load off or limit. |
| UVP Alarm ¹ | Undervoltage protection. The voltage went below the UVP setting (0 V to 150 V). | Load off |
| Watchdog Alarm | Watchdog protection. SCPI communication did not take place for a length of time that is equal to or exceeds the WDP setting. | Load off |

1. UVP can be set to off.

Clearing an alarm

1. Eliminate the root cause of the alarm, and press ENTER.

If you stop the alarm without eliminating the cause, an alarm will occur again. Change the input to pin 5 of the EXT CONT connector from a low level signal to a high level signal. You can also clear an alarm on the rising edge of this signal.

Setting the alarm 2 operating condition

• Overcurrent protection (CR/CV/CP mode)

Press SOURCE > Level and then OCP to select OCPL (or OCPT). Use the numeric keypad or the rotary knob to set a current value. Press Action to set the action to perform when a protection is activated to load off (Trip) or current limit (Limit).

• Overpower protection (CC/CR/CV/ARB mode)

Press SOURCE > Level and then OPP to select OPPL (or OPPT). Use the numeric keypad or the rotary knob to set a power value. Press Action to set the action to perform when a protection is activated to load off (Trip) or current limit (Limit).

• Undervoltage protection (CC/CR/CP/ARB mode)

Press SOURCE > Level and then UVP to select UVP. Use the numeric keypad or the rotary knob to set a voltage value. To turn off UVP, turn the rotary knob counterclockwise to select OFF.

• Watchdog protection

Press SYSTEM. On the Configure screen, use the rotary knob to select Delay under Watchdog, and press Edit. Use the numeric keypad or the rotary knob to enter the time [s], and then press ENTER. Use the rotary knob to select Watchdog, and then press Edit. Use the rotary knob to select Enable, and then press ENTER.

Arbitrary I-V Characteristics (ARB) Mode

Arbitrary I-V characteristics can be set by registering multiple I-V characteristic points (set of voltage value and current value).

Editing I-V characteristics

1. Press SOURCE > Mode > Next > ARB.
2. Press Level > Table.
3. Use the rotary knob and ◀/▶ keys to select a value.

You can select a row with the rotary knob and use the ◀/▶ keys to change the Voltage and Current.

4. Editing I-V characteristics.

| Purpose | Operation |
|-----------------------------|---|
| Change a value ¹ | Press Table(*Edit), use the numeric keypad or the rotary knob to enter the value, and then press ENTER. |
| Increment/decrement rows | Press the Count key, use the numeric keypad or the rotary knob to enter the total number of rows, and then press ENTER. |

1. The voltage and current on the first line and the voltage on the last line cannot be changed. For voltage, you cannot enter a value that is greater than the value in the next row.

Repeat steps 2 and 3 to set the IV characteristics.

Turning the load on in ARB mode

1. Press SOURCE > Mode > Next > ARB.

The ARB mode is set.

2. Press LOAD.

The load is turned on in ARB mode.

Switching Function

Repeatedly executes two settings. Here, the procedure for setting the switching interval using frequency and duty ratio (ratio of high level in a cycle) is explained.

The switching function operates in CC mode and CR mode.

1. Press SOURCE > Switching > Depth.
2. Use the numeric keypad or rotary knob to enter the switching level (Depth).

The input switches between current value [A]/conductance value [S] input and percentage [%] input every time you press the Depth key.

3. Press Freq.
4. Use the numeric keypad or the rotary knob to enter the frequency.
5. Press the DUTY key.
6. Use the numeric keypad or the rotary knob to enter the duty ratio.
7. Press Switching Off.

The display switches Switching On, and the switching function turns on.

ABC Preset Memories

Current, conductance, voltage, and power can be saved to and recalled from three memories, A, B, and C.

Saving to preset memory

1. Set the range and value in the operation mode that you want to save in.
2. Press SOURCE > ABC (twice) > Store.
3. Press the save destination memory (A, B, C).
4. Press ENTER.

Saves the settings to preset memory.

Recalling preset memory entries

1. Press SOURCE > ABC (twice) > Recall.
2. Press the memory (A, B, C) to recall.

The settings are recalled.

Setup Memory

Settings, such as the operation mode and current, range setting, preset memory, and so on can be saved and recalled.

Saving to the setup memory

1. Specify settings in the operation mode that you want to save in.
2. Press SYSTEM > Recall Save.
3. Use the rotary knob to select the setup memory.
4. Press Save.

The setting contents are saved to the setup memory.

Recalling a setup memory entry

1. Check that the load is turned off.
2. Press SYSTEM > Recall Save.
3. Use the rotary knob to select the setup memory.
4. Press Recall.

The setup memory entry is recalled.

The settings prior to the recall are overwritten.

Checking the setup memory details

1. Press SYSTEM > Recall Save.
2. Use the rotary knob to select the setup memory.
3. Press Property.

The detailed information of the setup memory is displayed. The detailed information can be scrolled by using the rotary knob. Press again the Property key to return to the original state.